RESEARCH PROPOSAL

RELATIONSHIP BETWEEN HEALTH AND ECONOMIC GROWTH IN RAJASTHAN: AN ECONOMETRIC ANALYSIS

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List of Contents

S.No.	Title	Page No.
1.	Introduction	4
2.	Review of Literature	6
3.	Research Objectives	14
4.	Database and Methodology	15
5.	Tentative Chapter Scheme	17
6.	Bibliography	18

List of Abbreviations

Abbreviations	Meaning
HDI	Human Development Index
RTE	Right to Education
CSR	Child Sex Ratio
TFR	Total Fertility Rate
IMR	Infant Mortality Rate
GDP	Gross Domestic Product
OECD	Organization for Economic Co-operation and Development
NSDP	Net State Domestic Product
ECM	Error Correction Model
ADF	Augmented Dicky-Fuller

INTRODUCTION

Health is considered as a significant form of human development. If people are living free from the problems of malnutrition and diseases (mental and physical), it adds to their economic well-being and, therefore, health systems for a nation are considered important. There are many socio-economic determinants that affect the health outcomes like female literacy, income levels, male child preference, antenatal care, public health expenditure and so on. With respect to these factors affecting the health status, there is a vast literature on health economics that talks about the association of health with economic growth.

Production needs human capital as well as physical capital as inputs. The contribution of health to economic growth has been neglected as compared with the importance given to education.

Education and health in the form of human capital are responsible for increasing labour quality and productivity. Hence, both health and education are important indicators to enhance productivity of labour which is essential for economic development. A country would not be able to achieve a state of continuous growth without the minimum levels of education and health in its labour force.

Historically, Rajasthan has been placed fairly low in terms of human development. In terms of human development index, it stood 28th among 32 states and union territories in 1981, with only Madhya Pradesh, Uttar Pradesh and Bihar among the larger states behind; the rank improved marginally in 1991 to 27 with Orissa also falling behind. However, the National Human Development Report 2001 placed Rajasthan at the 9th position in terms of human development index among the 15 larger states, which implied substantial improvement in the state. More recently,

the 12th Finance Commission divided the states of India into five groups ranging from high to low according to selected indicators of human development and infrastructure index. Rajasthan was in the group 'lower middle' for human development and in the group 'low' for infrastructure. Thus, despite starting at a relatively low level of human development, the state has improved its position, particularly in the nineties. But there is a long way to go yet, and the relatively low level of per capita income of the state implies that its efforts have to be broadly directed at a combination of economic development with human development, by no means an easy task. There is substantial variation in the level of human development (and other aspects of development) within the state, as can be expected. Also, the overall correlation between the three components of HDI – education, health and income – is unmistakable, though this may not be true for individual districts or small groups of districts. The state has to strive for economic development and human development at the same time. With a large part of the population dependent on agriculture, repeated droughts and the ever-increasing threat of water scarcity, the state runs a real risk of actually experiencing a rise in poverty levels. Rajasthan has historically been considered as a "backward state" in India, being included in the BIMARU list category. However, recent initiatives and steps taken by government with support of the private sector has helped in breaking this old adage.

REVIEW OF LITERATURE

Mohapatra (2017) tried to employ a two-step approach to investigate the bi-directional causal linkage between: economic growth (measured by GDP) and public expenditure on health; public expenditure on health and infant mortality rate (IMR); and IMR and economic growth within the Indian context. The study used Panel cointegration and Granger causality on 20-year panel data on 16 major Indian states to investigate the causality. The results suggested that GDP to Granger cause public expenditure on health both in the short run and in the long run, but public expenditure on health to Granger cause GDP only in the long run. Further, public expenditure on health and economic growth were found to Granger cause IMR in the long run. However, the reverse linkage from IMR to public expenditure on health and/or economic growth was not significant.

Somayeh et. al (2013) investigated the effect of health, such as fertility rate, total (birth per woman), life expectancy at birth, total (years) and mortality rate, under-5(per 1000 live birth), as well as capital stock on the economic growth of sixteen developed countries and fourteen developing countries. They used Panel Unit Root and Panel Data Model. The period of their study was 1990-2010. In this investigation they found that life expectancy and capital stock had a statistically significant positive impact on economic growth in both groups of nations. Mortality rate had a statistically significant negative effect on economic growth in both groups of countries. On the other hand fertility rate had a statistically significant positive effect on economic growth in developed countries while it had a statistically significant negative effect on economic growth in developing

countries. Also the study results showed that the fixed effects approach was more appropriate.

Hassan and Cooray (2012) found that male life expectancy had a positive effect on income growth, while female life expectancy had a negative effect. They used a production function-based approach, the role of health as a regular factor of production, and lag differences of life expectancy and school enrolments and lagged growth rates of other inputs as instruments for controlling the endogenity of health in the growth regressions in 83 countries during 1960–2009.

Mehrara and Musai (2011) examined the short and long run relationships between health expenditure (as a measure of health) and GDP in Iran over the period 1970 to 2008. They used Autoregressive Distributed Lag (ARDL) approach to co-integration and Error Correction Models (ECM). The study found that, there exists a co-integrating relationship among GDP, health expenditure, capital stock, oil revenues and secondary enrolment ratio (as a proxy of education). It showed that the impact of health expenditure on output is statistically insignificant and trivial in size. In other words, health expenditure did not contribute to the output level of the economy in the short and long runs. It was attributed to low productivity of inputs, and inefficiency of investments and facilities in health sector.

Faisal and Waheed (2011) estimated the relationship between human capital and economic growth in Pakistan by using the Cobb-Douglas production function.

Their study confirmed the long run positive relationship between human capital and economic growth. The health adjusted education indicator for human capital was found to be a highly significant determinant of economic growth.

Swift (2010) used Johansen multivariate co-integration analysis to study the relation between health and Gross Domestic Product for 13 OECD countries for periods ranging from 1820-2001 to 1921-2001. A similar, long run, cointegrating relationship between life expectancy and both total GDP and GDP per capita was found for all of the countries estimated. The relationships showed a significant influence on both total GDP and GDP per capita in most of the countries estimated, with 1% increase in life expectancy resulting in an average 6% increase in total Gross Domestic Product in long run, and 5% increase in GDP per capita. Total GDP and GDP per capita also showed a significant influence on life expectancy for most countries. There was no evidence of changes in the relationships for any country over the periods estimated, indicating that shifts in the major causes of illness and death overtime do not seem to have influenced the link between economic growth and health.

Emadzade (2010) used a method derived from Romer's endogenous growth model, a panel data approach, for the period 2000-2007 with cross-sectional data for 27 provinces of Iran. It showed the positive effect of household health expenditure growth and government investment expenditure on economic growth in the provinces of Iran. Moreover, the results showed a negative relationship between consumer price index (CPI) and economic growth of each province.

Household health care expenditure had a significant effect on economic growth in the provinces.

Akram et. Al (2009) investigated the impacts of different health indicators on economic growth in Pakistan. Co integration and Error Correction techniques have been used on the time series data of Pakistan for the period of 1972-2006. They find that per capita GDP is positively influenced by health indicators in the long run and health indicators cause per capita GDP. However, in the short run, health indicators fail to have significant impact on per capita Gross Domestic Product. It reveals that health indicators have a long run impact on the growth of the economy. It additionally suggests that impact of health is merely a long run phenomenon and during the short run there is no significant relation that exists between economic growth and health variables. The major policy implication of the study was that if we desire high levels of per capita income, we can achieve it by increasing and improving stock of health human capital, particularly when current stocks are at the lower end.

Mehdi et. al (2009) studied Importance and status of Health in Development and prosperity of the Iranian economy. In this regards, they have used Solo model. This study used annual time series data (1961-2007) and unit root tests and analyze them using Smooth Transition Regression (STR) model. This nonlinear technique accommodates potential structural breaks that could undermine the existence of a long-run relationship between economic growth and Health in Development. The results showed that there was a significant and positive relationship between economic growth and Health in Development and its determinants.

Siddiqui (2008) used simultaneous equation model for identifying the relevance of primary needs of methods for human development in Asia, Africa and rest of the countries in the world. It was found that the effect of human development on primary need satisfaction is overall in direct at world level that is the persons with higher income have higher capabilities which in return give rise to higher per capita income. No doubt improvement in the infant mortality rate and per capita income both affect human development significantly but the role played by income for meeting the basic need expenditure is higher at the world level. These results may vary from region to region but they concluded that gainful expenditure has always an edge over the other methods of human development. Net results showed that policies which were growth oriented and leading to development of capabilities were ultimately responsible for increasing of income and improvement of infant mortality rate needed for over all human development. Though income has priority among all the methods deployed for human development yet the public expenditure on social sector cannot be ruled out. It was clear from the decomposition analysis that there is urgent need to increase the expenditure on gainful capital than on education and health in Pakistan so that the country may attain the level of achievement that has been attained at the regional as well as global level.

Hadian et al. (2008) examined the effect of health expenditure on economic growth in Iran for the period 1980-2004. They used Solow model and evaluated the results by Hussmann test. The findings show a positive and statistically significant effect of health expenditure and population growth on economic growth.

Ranis (2004) gives the two way relationship between economic growth and human development which suggests that nations may enter either into a virtuous cycle of high growth and large gains in human development or a vicious cycle of low growth and low rates of Human Development improvement. In these states, levels of Economic Growth and Human Development are mutually reinforcing either leading towards an upward spiral of development or a poverty trap. The existence and persistence of these cycles depends on the strengths of the linkages previously cited between Economic Growth and Human Development. Countries may also find themselves in a lop-sided state at least temporarily with relatively good growth and relatively poor Human Development or vice versa.The findings of the study also have strong implications for government policy. If Human Development improvements are needed a pre condition for sustainable Economic Growth, government policy and public funding may be necessary to move a nation above the Human Development threshold level. Nations stuck in vicious cycles or low Human Development poverty traps may need targeted government investment to meet the fixed costs of Human Development improvements that will lead to economic growth. These fixed cost investment may include schools, hospitals and the necessary governance improvements to effectively implement investment projects.

Bhargava et al. (2001) investigated the impacts of health indicators such as adult survival rates (ASR) on Gross Domestic Product growth rates at 5-year intervals in various countries. They used Panel data approach for Gross Domestic Product series based on purchasing power adjustments and on exchange rates. First, they developed a framework for modeling the inter-relationships between GDP growth

rates and explanatory variables by re-examining the life expectancy–income relationship. Second, estimation of models for growth rates was done to take into consideration the interaction between ASR and lagged Gross Domestic Product level; problems with endogeneity and reverse causality were addressed. Lastly, they computed confidence intervals for the effect of ASR on growth rate and applied a test for parameter stability. They found a positive relationship between adult survival rate and economic growth.

Bloom et al. (2001) have analyzed aggregate economic growth by estimating a production function model that includes two variables that micro economists have identified as fundamental elements of human capital: health and work experience. They constructed a panel of countries observed every 10 years over 1960–90.Their main result is that good health has a positive, sizable, and statistically significant effect on aggregate output even after we control for the experience of the workforce. They argue that the effect of life expectancy in growth regressions seems to be an effect of real labor productivity, and is not the result of life expectancy acting as a proxy for worker experience. Their findings show that health capital is a significant variable for the growth of the economy under the two-stage least squares method.

Pritchett L., Summers L.H. (1996) have tried to estimate the impact of income on health by using cross-country, time-series data on health (infant and child mortality and life expectancy) and income per capita. They used instrumental variables estimates using the exogenous determinants of growth of income to identify the impact of income on health, isolated from reverse causation or incidental

association. The long run income elasticity of child and infant mortality in developing countries lies between -0.2 and -0.4. Using these estimates, they calculated that over half a million child deaths in 1990 in the developing world can be attributed to the poor economic performance in the 1980s.

Research Gap

A lot of literature on the relationship between education and economic growth in Rajasthan is available but there is a dearth of literature on the relationship between health and economic growth.

RESEARCH OBJECTIVES

1. To assess the present status of health in Rajasthan and to identify its main determinants.
2. To examine the relationship between public expenditure on health and economic growth.
3. To examine the relationship between health indicators and economic growth in Rajasthan.
4. To offer policy suggestions on the basis of the findings of the study to make the public health system of Rajasthan more effective.

Hypothesis

- H_o: There is no significant relationship between economic growth and public expenditure on health.
- H_o: There is no significant relationship between economic growth and health indicators.

DATABASE AND METHODOLOGY

Data

The study will be based on secondary data collected from various sources such as Annual Vital Report, Statistical Abstract of Rajasthan, Basic Statistics of Rajasthan and Some facts about Rajasthan published annually by the Directorate of Economics and Statistics (DES), Government of Rajasthan, Jaipur. The data on health will be obtained from different sources like National Family Health Survey, Sample Registration Survey (SRS) and Census of India. The data on NSDP and PCNSDP (Per Capita Net State Domestic Product) will be obtained from the Directorate of Economics and Statistics (DES), Government of Rajasthan, Jaipur.

The time period of the study will be 1997-2017.

Methodology

Different methods and approaches will be used for analyzing the data.
To pursue the **first objective**, a descriptive analysis of the health status in Rajasthan in terms of Sex Ratio, Infant Mortality Rate, Crude Birth Rate, Crude Death Rate, Total Fertility Rate and Maternal Mortality Rate will be conducted and appropriate economic tools will be used as per the nature of data.

The **second objective** of the study will be carried out using appropriate statistical tools as per the nature of data on public expenditure on health and economic growth in Rajasthan.

To achieve the **third objective**, a time series and panel data approach will be used to understand the relationship between economic growth and health. Granger Causality Test will be used to addresses the causality of two indicators under the study.

TENTATIVE CHAPTER SCHEME

1. Introduction
2. Review of Literature
3. Health Status in Rajasthan
4. Theoretical Framework about the relationship between Health and Economic Growth
5. Public Expenditure on Health in Rajasthan
6. Health and Economic Growth
7. Summary and Conclusions

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